Ann Arbor Rotary Talk

Good News

UM is better, stronger, and more exciting and vital than ever

Quality

National rankings highest in 25 years
Ebb and Flow analysis indicates we’re holding our own

People

Michigan Mandate:
Students: 12% to 23% (AA: 4% to 8.5%)
Faculty: 9% to 12% (AA: 2.6% to 4.8%)

Michigan Agenda for Women
Bylaw 14.06

Student Activities
From Americorps to Sunrunner to Leadershape

Financial strength
Not only accommodate loss of state support, but more diverse
and robust resource portfolio ($2.5 billion/year)

Faculty salaries:
Moved past UC to now rank #1 among publics
(consistent with policy)
Professors: #11 (just about to pass Cornell)
Harvard, Princeton, Stanford, Yale, Chicago, Columbia
Penn, Northwestern, Cornell ahead of us
Assoc Prof: 6th
Asst Prof: 8th

Rise to #1 research university in nation
Campaign: $670 M ($150 M per year)
Endowment: $300 M to $1 B

Administrative costs: Lowest among public & private peers
(4% of total expenditures)
Wall Street: Credit Rating: AA1 (highest among public universities

Physical Plant:
Within 5 years, will have completed rebuilding campus
Central Campus
North Campus
Medical Campus
South Campus
$600 million!

Auxiliary Activities
  UM Hospital most successful in nation
  UM Athletics rated #1 in US

Excitement
  Undergraduate Education
  Professional Schools (Medicine, Business, SILS,...)

But...concerns
Throughout past decade, we have all worked to make
  UM the finest university in the world, but within the 20th Century paradigm
Sometimes I worry that I may be sounding like the CEO of IBM
ten years ago when he briefed his Board of Directors,
  congratulating them on building IBM into the strongest company in the world.
And yet look at them now.
  They built the finest 20th Century corporation in the world.
  The only problem was that our society was already moving into the 21st Century.
In fact, I wake up at night thinking...
  ...IBM...GM...UM...
  ...are we next?
Yet, there are many signs that this paradigm may no longer be adequate to serve a rapidly changing society in a rapidly changing world.
The University as a “knowledge server”

The Challenge of Change
We are living in the most extraordinary of times.
Who would have predicted a few years ago
  the collapse of communism,
  the end of the Cold War,
  the redefinition of the world economic order
  the direct manipulation of the human gene to cure disease
  the Internet phenomenon, linking 20 million people worldwide
digital convergence, in which phone and computer companies merge with the entertainment industry
Yet all of these events have happened,
  and the pace of change continues to accelerate.
Indeed, many believe that our civilization is going through a period of transformation just as profound as those that occurred in earlier times such as the Renaissance or the Industrial Revolution, except while these earlier transformations took centuries to occur, those characterizing our times will occur in a decade or less.

Some portray the 1990s as a countdown toward a new millennium, as we find ourselves swept toward the new century by these incredible forces of change.

But the events of the past several years suggest that the 21st century is already upon us, a decade early.

Note Peter Drucker article in Atlantic Monthly

This last point is very important for today we are seeing a dramatic shift in the fundamental structure, nature, and perspective of our society.

We are evolving rapidly to a new post-industrial, knowledge-based society, just as a century ago our agrarian society evolved through the Industrial Revolution.

Key in this transformation is the emergence of knowledge as a strategic commodity, as important as natural resources or low-skilled labor were at earlier times.

This new critical commodity knows no boundaries. It is generated and shared wherever educated, innovative, and creative people come together; and as we have learned, it spreads very quickly.

Indeed, the "age of knowledge" in which we now find ourselves is accompanied by a fundamental transformation in our economy that is reshaping virtually every product, every service, and every job throughout our country and indeed the world.

**An Example: A Communications-Driven Society**

In Michigan we have a unique vantage point from which to view a particularly important feature of these changes.

If there was one sector that most strongly determined the progress of the 20th century, it was transportation
and its related industries--cars, planes, trains, oil, space. Transportation determined prosperity, national security, even our culture--with the growth of the suburbs, international commerce, and so on.

During this period Michigan's automobile industry had no equal, and the state rapidly became one of the most prosperous and powerful industrial regions on earth.

Today things are very different.

We have entered a new era in which the engine of progress is not transportation but rather communication, enabled by the profound advances we are now seeing in computers, networks, satellites, fiber optics, and related technologies.

We now face a world in which hundreds of millions of computers easily can plug into a global information infrastructure.

Jacques Attali in his profound essay, Millennium, suggested that the impact of information technology will be even more radical than that of the harnessing of steam and electricity in the 19th century.

He suggested it would be rather more akin to the discovery of fire by early ancestors, since it will prepare the way for a revolutionary leap into a new age that will profoundly transform human culture.

On the University's North Campus is a large glass building, filled with computers, that in many ways represents just such a future for our state.

This is the command center of NREN, the National Research and Education Network, a massive network operated by the University in collaboration with IBM and MCI that links together the computers on university campuses, industry, and government laboratories throughout the world. In fact, today the network already links together over four million users worldwide and is doubling in size and scope every six months.

Already NREN links together
...2.3 million computers
...23,500 networks
...1,100 colleges and universities (90% of nation’s students)
...1,000 high schools, several hundred libraries
With the associated Internet
...20 million people worldwide
...20 Terabytes of information
...World Wide Web
...Mosaic, Mozilla
Rapidly evolving technologies are dramatically changing the way we collect, manipulate, and transmit information.
This directly challenges the traditional paradigms of the university, where processes of knowledge creation, preservation, transmission, and application are still largely based on books, chalk boards, oral lectures, and static images.
In the last three decades, computers have evolved into powerful informationsystems with high-speed connectivity to other systems throughout the world.
Public and private networks permit voice, imagine, and data to be made instantaneously available across the world to wide audiences at low costs.
The creation of virtual environments where human senses are exposed to artificially created sights, sounds, and feelings liberate us from restrictions set by the physical forces of the world in which we live.
Close, empathetic, multi-party relationships mediated by visual and aural digital communications systems are becoming common, leading to the formation of closely bonded, widely dispersed communities of people interested in sharing new experiences and intellectual pursuits created within the human mind via sensory stimuli.
Computer-based learning systems are also being explored, opening the way to new modes of instruction and learning.
New models of libraries are being explored to exploit the ability to access vast amounts of digital data in physically dispersed computer systems which can be remotely accessed by users over information networks.
New forms of knowledge accumulation are evolving: written text, dynamic images, voices, and instructions on how to create new sensory environments can be packaged in dynamic modes of communication never before possible.

The applications of such new knowledge forms challenge the creativity and intent of authors, teachers, and students. Needless to say, the implications for our universities of these extraordinary challenges...and opportunities...are profound.

The Challenges of Change

As one of civilization's most enduring institutions, the university has been quite extraordinary in its capacity to change and adapt to serve society. Far from being immutable, the university has changed quite considerably over time and continues to do so today. A simple glance at the remarkable diversity of institutions comprising higher education in America demonstrates this evolution of the species.

The profound nature of the challenges and changes facing higher education in the 1990s seems comparable in significance to two other periods of great change in the nature of the university in America: the period in the late nineteenth century when the comprehensive public university first appeared and the years following World War II when the research university evolved to serve the needs of postwar America.

Today we face challenges and opportunities similar to those characterizing these two earlier periods of transformation. Many point to negative factors, such as i) the rapidly growing costs of quality education and research during a period of limited resources, ii) the erosion of public trust and confidence in higher education, iii) or the deterioration in the partnership characterizing the research university and the federal government. But I believe our institutions will be affected even more profoundly...
by the powerful changes driving transformations in our society, including
i) the increasing ethnic and cultural diversity of our people;
ii) the growing interdependence of nations;
iii) the degree to which knowledge itself has become
    the key driving force in determining economic prosperity,
    national security, and social well-being;
iv) and, of course, the digital age, which is now revolutionizing
    “knowledge businesses” such as higher education.

What are we...and how we get this way?
Images of the University
To the public:
    ...students in classroom
    ...elderly professor teaching Shakespeare
    ...almost a high school image
To ourselves
    ...the Oxbridge image
    ...detached critic of society
In reality we are something quite different: U of M, Inc.
Oncampus education:
    ...50,000 students on three campuses
    ...$800 M per year (only about 25% of budget)
R&D:
    ...major FFRDC
    ...$440 M per year
Health Care: UMMC
    ...850,000 patients per year
    ...$1.2 B per year
Managed Care: M-Care
    ...70,000 “managed lives” (growing to 1.5 M)
    ...$150 M per year
Captive Insurance Company: Veritas
    ...$200 M per year
Knowledge services
    ...Continuing Education
    ...Extension
    ...World-wide markets
...$100 M per year (and growing rapidly)
Entertainment: Michigan Wolverines
...$250 M per year
Diagram: UofM, Inc.

It is true that Michigan is a prime example of
“a loosely-coupled, adaptive system,
with a growing complexity as its various components
respond to changes in the environment”
It is also true that Michigan is
“a learning organization”.
...a holding company for 3,000 entrepreneurs
And that it has evolved over the years due to
...creativity and energy of its faculty (as entrepreneurs)
...the efforts of its many components to excell
...a “transactional” culture where everything is up for
negotiation
But, look where this has led us! UofM, Inc!
(Note: Some of us know precisely where and what UM is today!)

The Changing Nature of the University’s Fundamental Missions
One frequently hears the primary missions of the university referred to in terms of teaching, research, and service. But these roles can also be regarded as simply the twentieth century manifestations of the more fundamental roles of creating, preserving, integrating, transmitting, and applying knowledge.

From this more abstract viewpoint, it is clear that while these fundamental roles of the university do not change over time, the particular realization of these roles do change—and change quite dramatically, in fact. Consider, for example, the role of "teaching," that is, transmitting knowledge.

While we generally think of this role in terms of a professor teaching a class of students, who, in turn, respond by reading assigned texts, writing papers, solving problems or performing experiments, and taking examinations, we should also recognize that classroom instruction is a relatively recent form of pedagogy.

Throughout the last millennium, the more common form of learning was through apprenticeship. Both the neophyte scholar and craftsman learned by working as apprentices to a master. While this type of one-on-one learning still occurs today, in skilled professions such as medicine and in advanced education programs such as the Ph.D. dissertation, it is simply too labor-intensive for the mass educational needs of modern society.

The classroom itself may soon be replaced by more appropriate and efficient learning experiences. Indeed, such a paradigm shift may be forced upon the faculty by the students themselves. Today's students are members of the "digital" generation. They have spent their early lives surrounded by robust, visual, electronic media--Sesame Street, MTV, home computers,
video games, cyberspace networks, and virtual reality. They approach learning as a "plug-and-play" experience, unaccustomed and unwilling to learn sequentially--to read the manual--and rather inclined to plunge in and learn through participation and experimentation. While this type of learning is far different from the sequential, pyramid approach of the traditional university curriculum, it may be far more effective for this generation, particularly when provided through a media-rich environment. Hence, it could well be that faculty members of the twentieth-first century university will be asked to set aside their roles as teachers and instead be become designers of learning experiences, processes, and environments. Further, tomorrow's faculty may have to discard the present style of solitary learning experiences, in which students tend to learn primarily on their own through reading, writing, and problem solving. Instead they may be asked to develop collective learning experiences in which students work together and learn together with the faculty member becoming more of a consultant or a coach than a teacher. One can easily identify other similarly profound changes occurring in the other roles of the university. The process of creating new knowledge--of research and scholarship--is also evolving rapidly away from the solitary scholar to teams of scholars, perhaps spread over a number of disciplines. Indeed, is the concept of the disciplinary specialist really necessary--or even relevant--in a future in which the most interesting and significant problems will require "big think" rather than "small think"? Who needs such specialists when intelligent software agents ("spiders")
will soon be available to roam far and wide through robust networks containing the knowledge of the world, instantly and effortlessly extracting whatever a person wishes to know?

So, too, there is increasing pressure to draw research topics more directly from worldly experience rather than predominantly from the curiosity of scholars.

Even the nature of knowledge creation is shifting somewhat away from the analysis of what has been to the creation of what has never been--drawing more on the experience of the artist than upon analytical skills of the scientist.

The preservation of knowledge is one of the most rapidly changing functions of the university.

The computer--or more precisely, the "digital convergence" of various media from print to graphics to sound to sensory experiences through virtual reality--has already moved beyond the printing press in its impact on knowledge.

Throughout the centuries the intellectual focal point of the university has been its library, its collection of written works preserving the knowledge of civilization.

Yet today, such knowledge exists in many forms--as text, graphics, sound, algorithms, virtual reality simulations--and it exists almost literally in the ether, distributed in digital representations over worldwide networks, accessible by anyone, and certainly not the prerogative of the privileged few in academe.

Finally, it is also clear that societal needs will continue to dictate great changes in the applications of knowledge it expects from universities.

Over the past several decades, universities have been asked to play the lead in applying knowledge across a wide array of activities,
from providing health care, to protecting the environment, from rebuilding our cities to entertaining the public at large (although it is sometimes hard to understand how intercollegiate athletics represents knowledge application).

This abstract definition of the roles of the university have existed throughout the long history of the university and will certainly continue to exist as long as these remarkable social institutions survive.

But the particular realization of the fundamental roles of knowledge creation, preservation, integration, transmission, and application will continue to change in profound ways, as they have so often in the past.

And hence, the challenge of change, of transformation, is, in part, a necessity simply to sustain our traditional roles in society.

**The Need to “Reinvent” the University**

We face a particular dilemma in developing more revolutionary models for the American university because of challenges mentioned early in this talk.

The pace and nature of the changes occurring in our world today have become so rapid and so profound that social institutions such as universities have great difficulty in sensing and understanding the true nature of the changes buffeting them about, much less in responding and adapting adequately.

Indeed, there are some who suggest that our present knowledge-based institutions, such as universities, the media, and federal or industrial laboratories, which have been the traditional structures for intellectual pursuits, may turn out to be as obsolete and irrelevant to our future as the American corporation of the 1950s.

Hence any process aimed at articulating and analyzing new models for the university must do so with the recognition that these models must themselves adapt to an environment of continual change.

We must take great care not simply to extrapolate the past, but to examine the full range of possibilities for the future.

With this caveat in mind, let us consider several of the more provocative themes suggested by colleagues across the University to illustrate the broad range of possibilities for the university of the twenty-first century.
These include

the state-related, but world-supported, university
   A university with a strong public character, but supported primarily through resources it must generate itself (e.g., tuition, federal grants, private giving, auxiliary enterprises), not through general purpose appropriations.
the "world" university
   As a new world culture forms, a number of universities will evolve into learning institutions serving the world, albeit within the context of a particular geographical area (e.g., North America).
the diverse university (or the "uni-di-versity")
   A university drawing its intellectual strength and its character from the rich diversity of humankind, providing a model for our society of a pluralistic learning community in which people respect and tolerate diversity even as they live, work, and learn together as a community of scholars.
the cyberspace university
   A university that spans the world (and possibly even beyond) as a robust information network linking together students, faculty, graduates, and knowledge resources.
the creative university
   As the tools for creation become more robust (e.g., creating materials atom-by-atom, genetically engineering new life forms, or computer-generating artificial intelligence or virtual reality), the primary activities of the university will shift from a focus on analytical disciplines and professions to those stressing creative activities (i.e., "turning dreams into reality").
the divisionless university
   The current disciplinary (and professional) organization of the University is viewed by many as increasingly irrelevant to their teaching, scholarship, and service activities. Perhaps the university of the future will be far more integrated and less specialized through the use of a web of virtual structures which provide both horizontal and vertical integration among the disciplines and professions.
the university college
It seems clear that we need to develop a new paradigm for undergraduate education within the complex environment provided by a comprehensive research university. This "university college" should draw on the intellectual resources of the entire university: its scholars, libraries, museums, laboratories, graduate and professional programs, and its remarkable diversity of people, ideas, and endeavors.

the university as capstone of a lifelong sequence of education

Since education will increasingly require a lifetime commitment, perhaps the University should reinvent itself to span the entire continuum of education, from cradle to grave. It could form strategic alliances with other components of the educational system, and commit itself to a lifetime of interaction with its students/graduates, providing them throughout their lives with the education necessary to meet their changing goals and needs.

Even further questions...

Will a "university of the 21st century" be localized in space and time,

or will it be a "metastructure," involving people throughout their lives wherever they may be on this planet--or beyond?

Is the concept of the specialist really necessary--or even relevant--in a future in which the most interesting and significant problems will require "big think," rather than "small think?" Will intelligent software agents roam far and wide through robust networks containing the knowledge of the world and instantly and effortlessly extract whatever a person wishes to know?

Will lifestyles in the academy (and elsewhere) become increasingly nomadic, with people living and traveling where they wish, taking their work and their social relationships with them?
In the spirit of these questions, perhaps we should pay far more attention to evolving new structures more appropriate for the evolving information technology. One example would be the collaboratory, envisioned as an advanced, distributed infrastructure which would use multimedia information technology to relax the constraints on distance, time, and even reality.

One approach: The New University

Could we create within our institutions a "laboratory" or "new" university that would serve as a prototype or test bed for possible features of the University of the twenty-first century? The "New U" would be an academic unit, consisting of students, faculty, and programs, with a mission of providing the intellectual and programmatic framework for continual experimentation.

Note: universities have never invested much in CR&D

...industry: 3% of sales
...federal target: 3% of GDP
...UM: 0.1% of GF???

The Process of Change

So how does an institution as large, complex, and tradition-bound as the modern research university go about transforming itself. Historically we have accomplished change using a variety of mechanisms:

i) "buying" change with additional resources;

ii) laboriously building the consensus necessary for grassroots support of change;

iii) changing key people; iv) finesse;

iv) finesse...or by stealth of night;

vi) The Nike Approach: "Just do it!," that is, top-down decisions followed by rapid execution (following the old adage that "it is better to seek forgiveness
than to ask permission").

For the type of institutional transformation necessary to move toward the major paradigm shifts that will likely characterize higher education in the years ahead, we will need a more strategic approach capable of staying the course until the desired changes have occurred.

Indeed, many institutions have already embarked on major transformation agendas similar to those characterizing the private sector. Some even use similar language as they refer to their efforts to "transform," "restructure," or even "re-invent" their institutions.

But, of course, herein lies one of the great challenges to universities, since our various missions and our diverse array of constituencies give us a complexity far beyond that encountered in business or government.

Note: UM Hospitals

...UM has won state's Baldrige prize for TQM efforts

As a result, the process of institutional transformation is necessarily more complex.

Experience demonstrates that the process of transforming an organization is not only possible but also understandable and even predictable, to a degree.

The revolutionary process starts with an analysis of the external environment and the recognition that radical change is the organization's best response to the challenges it faces.

The early stages are sometimes turbulent, marked by conflict, denial, and resistance. But gradually, leaders and members of the organization begin to develop a shared vision of what their institution should become and to turn their attention to the transformation process.

In the final stages, grass-roots incentives and disincentives are put into place to create the market forces to drive institutional change; and methods are developed to measure the success of the transformation process. Ideally, this process never ends.
Through the experience of organizations in both the private and public sector, several features of transformation processes should be recognized at the outset:

i) First, it is critical to define the real challenges of the transformation process properly. The challenge is usually not financial or organizational. Rather it is the degree of cultural change required. We must transform a set of rigid habits of thought and arrangements that are currently incapable of responding to change either rapidly or radically enough.

ii) It is important to achieve true faculty participation in the design and implementation of the transformation process, in part since the transformation of the faculty culture is the biggest challenge of all. But here the faculty participation must involve its true intellectual leadership rather than the political leadership more common to formal faculty governance.

iii) It has been found that the use of an external group is not only very helpful but probably necessary to provide credibility to the process and assist in putting controversial issues on the table (e.g., tenure reform).

iv) Unfortunately, no universities--and few organizations in the private sector--have been able to achieve major change through the motivation of opportunity and excitement alone. Rather it has taken a crisis to get folks to take the transformation effort seriously--and sometimes even this is not sufficient.

v) The president must play a critical role both as a leader and as an educator in designing, implementing, and selling the transformation process, particularly with the faculty.
The necessary transformations will go far beyond simply restructuring finances to face the brave new world of limited resources. Rather, they will encompass every aspect of our institutions, including:
- the mission of the university
- financial restructuring
- organization and governance
- general characteristics of the university
- intellectual transformation
- relations with external constituencies
- cultural change

**Concern**

The Michigan entrepreneurial culture, at least with the present set of rules and constraints, has led to an institution with the following problems:
- ...it has diluted its “core businesses” with lots of entrepreneurial efforts
- ...it has become so complex that few even know what it is
- ...the difficulty in allowing out-moded and obsolete activities to disappear has put us very much at risk

In a sense, we have become sufficiently encumbered with processes, policies, procedures, practices of the past that our very best people, our most exceptional and creative people no longer determine the direction of the University.
- ...funding limitations
- ...resource allocation (incremental budgeting which preserves the past)
- ...personel policies
- ...disciplinary dominance
- ...consensus gridlock

JJD approach is, in reality, natural evolution
- ...with constraints to preserve fundamental values and mission
- ...but freeing most creative people to drive the institution

Natural Evolution
That is, to attract, retain, and nurture extraordinary people and let them drive the University. This is why Vision 2017 is well-defined in the center, and blurry on the edges... suggesting that the new paradigms will be created by our very best people...

Vision 2017
The basic approach is to
i) Attract and retain exceptional people of true creativity
ii) To remove constraints on creativity and adaptability, to create a fault-tolerant system
iii) But to constrain evolution to protect our fundamental missions, character, and values.

Concluding Remarks
There is an increasing sense among leaders of American higher education
and on the part of our various constituencies that the 1990s will represent a period of significant change on the part of our universities if we are to respond to the challenges, opportunities, and responsibilities before us.

A key element will be efforts to provide universities with the capacity
to transform themselves into entirely new paradigms that are better able
to serve a rapidly changing society and a profoundly changed world.

We must seek to remove the constraints that prevent our institutions
from responding to the needs of a rapidly changing society, to remove
unnecessary processes and administrative structures, to question existing
premises and arrangements, and to challenge, excite, and embolden the
members of our university communities to embark on this great adventure.

Our challenge, as an institution, and as a faculty, is to work together
to provide an environment in which such change is regarded not as threatening but rather as an exhilarating opportunity to engage in the primary activity of a university, learning, in all its many forms, to better serve our world.

The capacity for intellectual change and renewal has become increasingly important to us as individuals and to our institutions. In summary, our objective for the next several years is to provide our universities with the capacity to transform themselves into institutions more capable of serving our states, our nation, and the world.